(9)

AIR WAR COLLEGE

RESEARCH REPORT

No. AU-AWC-86-065

IS CORPORATE MANAGEMENT DULLING OUR TECHNOLOGICAL EDGE?

By COLONEL JOSEPH D. FERRIS

AIR UNIVERSITY
UNITED STATES AIR FORCE
MAXWELL AIR FORCE BASE, ALABAMA

Air War College
Air University

IS CORPORATE MANAGEMENT DULLING OUR TECHNOLOGICAL EDGE?

by

Joseph D. Ferris
Colonel, USAF

A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE RESEARCH

REQUIREMENT

Research Advisor: Lt Col Donald R. Cagle

Maxwell Air Force Base, Alabama

March 1986

TABLE OF CONTENTS

Disclaimer-Abstainer

This research report represents the views of the author and does not necessarily reflect the official opinion of the Air War College or the Department of the Air Force.

AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Is Corporate Management Dulling Our Technological Edge?

AUTHOR: Joseph D. Ferris, Colonel, USAF

The author examines funding trends in the Air Force technology and test base under the current DoD "uniform funding policy" and concludes that that policy intended to encourage efficiency and full utilization of in-house test capability in support of weapons development has had the opposite effect. He postulates the several dilemmas that confront test facility managers and test users, namely, The Reimbursement Dilemma, The Facilities Utilization Dilemma, The Operating Budget Dilemma and The Investment Dilemma and their impact on testing high technology systems and on maintaining the capability to test. He theorizes that the "uniform Funding policy" has given rise to a "marketplace mentality" which has affected the way the Air Force allocates resources to the technology and test areas. He offers three suggestions to change this perception and to insure that we preserve the technological advantage that underpins our national defense strategy.

BIOGRAPHICAL SKETCH

Colonel Joseph D. Ferris graduated from Virginia Polytechnic Institute with a B.S. in Metallurgical Engineering and received his commission through OTS. After initial assignments in Air Force Systems Command he completed pilot training at Laughlin AFB and C-130 RTU at Little Rock AFB. Operational tours with the 50th and 345th Tactical Airlift Squadrons at Ching Chuan Kang AB, Taiwan and Kadena AB, Japan followed. He then flew as a recovery pilot and headed the Satellite Operations and Plans Branch at the 6594th Test Group at Hickam AFB before attending the Army Command and General Staff College at Fort Leavenworth. He then served as a J-3 staff officer and as the CINCPAC Deputy Executive Assistant at HQ CINCPAC. Most recently he served as Chief and then Director of Test Resources, DCS/Test and Evaluation HQ AFSC.

IS CORPORATE MANAGEMENT DULLING OUR TECHNOLOGICAL EDGE?

Chapter I

INTRODUCTION

Following World War II, General Hap Arnold directed the dismantling of German aernonautical test facilities and their return to the United States. These facilities constituted the core of Air Force research and development efforts leading to the development of jet aircraft and the evolution of a technology and test base that today supports weapons systems that we depend upon to defend this country. We have since embraced a national security policy of depending on our technological edge to meet and defeat superior numbers of Soviet aircraft, tanks and artillery.

However, over the last two decades, as we've followed a corporate approach to the allocation of resources and to managing weapon system development we have lost sight of the need to apply resources basic to the research, development and testing required to maintain our technological advantage. General Arnold's German compressors still turn at Arnold Engineering Development Center (AEDC), the Air Forces' primary aeronautical test facility. In laboratories and test centers across DoD, decades old technology is supporting advanced development efforts because the DoD resource allocation process is not structured to hear nor accommodate the case of those who

advocate a strong technology and test base. This paper will explore the corporate barriers that have been erected that block technological progress and will make recommendations to restore the technology/test base through structural changes to give the tech/test community a voice in the resource advocacy process.

SETTING THE STAGE--THE R&D PROGRAM:

To understand the Air Force R&D program it is necessary to understand how it fits into the PPBS system. For purposes of planning, programming and budgeting, the DoD Five Year Defense Program, or FYDP, is divided into ten Major Force Programs or Mission Areas. They range from Program 1, which is Stragegic Forces to Program 10, which is Support to Other Nations. The R&D Program is Program 6 which consists of the basic and applied research and weapon systems tests which lead to operational systems. The R&D program is then further subdivided into five areas. "6.1 Research is the scientific study and experimentation directed toward increasing knowledge and understanding ...relating to long term national security needs" (11:8-2). 6.2 R&D, or Exploratory Development, includes studies which evaluate the feasibility of proposed solutions to military problems. 6.3 is Advanced Development which includes projects that move concepts into the experimental stage leading to the development of operational systems. Each of these, in turn, depend upon 6.5 which is R&D Management and Support. Management and

Support includes test ranges, space launch centers, instrumentation, ships and test aircraft which support R&D and transition R&D to operational systems (11:8-2). Collectively, this marriage of technology and test capability is commonly referred to as the Tech/Test Base. Providing for this necessary capability is not as glamorous as putting "rubber on the ramp" or as advocating modern weapons systems, but it is an essential part of the systems development process. This dicotomy has created the situation that exists today. Today, as weapon systems become increasingly more complex and the environment that they must operate in more threatening, the capability to test new systems is being allowed to erode. Moreover, the management process and organizational structure for allocating resources to these areas is becoming less sensitive to the need to preserve and modernize this necessary capability.

TECHNOLOGY BASE--THE 2% SOLUTION:

In 1984, General Marsh, the then Commander of Air Force Systems Command (AFSC), sponsored an initiative directed at reversing an unfavorable trend in the funding of the Air Forces's technology base. At Corona South, he challenged the Air Force leadership to recognize its responsibility to the future of the Air Force by supporting the Science and Technology Program, that portion of the R&D program that includes 6.1, 6.2, and 6.3. He outlined the S&T funding trends over the last

decade which showed a steady decline in real dollars since 1965 (chart 1), and moreover a declining share of Air Force TOA--falling from the historic 2-3 percent to 1.35 percent in 1984 (chart 2) (14:11). Having highlighted the problem, he proposed an S&T Recovery Plan--now commonly know as the 2 Percent Solution. In essence, it was a plan to achieve real growth in S&T funding to achieve, over the FYDP, a target of 2 percent real growth. In subsequent briefings to the Air Force Council and the MAJCOM Commanders during the FY84 Program Objective Memorandum (POM) deliberations, he spoke of the Tech Base saying:

> If this trend is allowed to continue--I am afraid that we will not leave our successors as well equipped to defend our great nation as we were...they will not have access to what has historically proved to be the single most important weapon in America's arsenal. Regaining technological superiority and expanding our qualitative edge requires more than just money. It requires understanding, commitment and support...to give the future and the capabilities of the future the kind of attention that our defense strategy demands... operational concepts that will both exploit the technologies of the future and provide the technology pull necessary to accelerate our R&D efforts (3-2).

In General Marsh's letter to all AFSC Commanders reporting on CORONA he said, "The Air Force Science and Technology Program is in trouble and there is just not enough funding currently programmed to do what needs to be done to guarantee our continued technological superiority (3-1). That R&D is critical to supporting our chosen national defense strategy is open to little debate. That

there are sufficient resources to return the technology base to historic levels is open to a much wider debate. That financial pressures within the test base are reducing the purchasing power of the tech base is also a certainty. Chart 3, for example, shows the increased cost borne by the tech base in utilizing test aircraft under the current test base funding policy (14:13).

Prior to 1974, Air Force technology programs could test for free aboard Air Force test aircraft. Now, as a result of management changes, the tech base, through user fees, supports a portion of the test base. The "2 percent solution", intended to restore the tech base share of Air Force TOA does nothing to insure that tech base dollars are spent on true R&D rather than symbiotically supporting the test base.

With the forwarding of the FY84 POM to OSD the S&T Recovery Plan was intact; however, with budget pressures what they were in 1985 the plan was a constant target in the various offset exercises. That it will fall victim to Gramm-Rudman adjustments is a certainty. That the tech base will continue to bear the cost of supporting the test base is also a certainty unless structural changes in the test base occur.

TEST BASE--A DRAIN ON THE TECH BASE:

The Test Base has experienced a similar decline in fortunes. The O&M and investment funding for the Air Force's major test centers, namely the Air Force Flight Test

Center at Edwards Air Force Base, Armament Division at Eglin AFB, Fla, Arnold Engineering and Development Center at Arnold Air Force Station and the 4950th Test Wing at Wright-Patterson AFB, Ohio is provided in a single Management and Support Account--Test and Evaluation Support, Program Element 65807. These facilities are where 6.1, 6.2, and 6.3 R&D efforts come together leading to major new weapon systems. Yet, over the last eight years as Defense spending has grown by a factor of three, and Air Force spending for R&D has multiplied by four, in real terms, spending to operate, maintain and modernize test facilities has lagged inflation by over $360 million dollars (charts 4 & 5).

The lack of financial support for this essential capability, like that for basic R&D, cannot be attributed to a reduced need for the capability. In fact, the additional dollars being invested in RDT&E and procurement represents systems that require testing, testing that the user, Congress and the general public demands be as realistic as possible. Instead, the capability to test is increasingly becoming technologically constrained due to lack of financial support. It is becoming increasingly difficult to test sophisticated one-of-a-kind electronic and computer based systems in a fly-fix-fly environment. For example, the F-16, with its fly-by-wire flight controls and sophisticated avionics was scheduled for a two year (1976-1977), 83 sortie avionics flight test program. But,

by 1979, that flight test program was only 70 percent complete and had consumed 287 sorties. Major avionics problems experienced led to the F-16 Multi-Staged Improvement Program which is still underway (16:). Yet, only in 1985, did a modern integrated test facility become available to ground test avionic and computer systems on the F-16. It is the Integrated Facility for Avionic Systems Testing or IFAST at Edwards Flight Test Center. The delay in moving from the 1960's fly-fix-fly approach to modern integrated test faciliies represents not only lost opportunity, but is emblematic of how corporate management has dulled our technological edge.

CHAPTER II

THE MRTFB--A NOBLE YET FLAWED CONCEPT:

The most significant change in the management approach to the tech/test base has been the Department of Defense's basic view that laboratory and test capability represents a service available to users and that the users must pay for this service. Previously, the services' industrially funded laboratory and test facilities were recognized for their contribution to R&D and testing was considered a legitimate cost of producing technologically superior weapon systems. The 1974 policy change, which created the Major Range and Test Facility Base, or MRTFB, also created a new marketplace mentality concerning testing.

In 1971, the Deputy Secretary of Defense directed that the DOD Comptroller, in conjunction with the military departments, DDR&E and DOD Installations and Logistics examine the current funding methodology at the services test ranges. The study was directed because over the previous twenty years there had been thought to be a lack of consistency in reimbursement policies at DOD in-house research, development, and test facilities. Many operated under institutional or industrial funding schemes which provided service at a minimal charge to users. The services made the investment in and paid for the operations and maintenance (O&M) of capabilities required to support development programs. While the 1971 study focused on funding policy, it led to major structural changes in how

programs plan for and test their systems. This change was fostered largely due to increasing congressional concern for the cost of programs resulting in a desire to segregate and allocate testing costs to specific programs. While there was evidence of a lack of consistency in the funding and operation of the 26 major test ranges studied, it was also recognized that the foremost consideration must be the adequacy and validity of testing. Mr.Packard's charge to the study group was to:

> Examine the application of current funding policy and propose changes or reaffirm existing ones that apply to the test and evalation centers to assure the most effective development and testing of material. The most important criterion is that funding practices of either users or range operators must not inhibit legitimate and valid testing (4:19).

The study group interviewed management at the 26 activities and project managers who were major users of test capability. Two basic issues surfaced, (1) Should there be a uniform funding policy for the major T&E support activities?, and (2) Should the users of T&E support activities such as project managers pay for the services, or should the services be provided through the parent service as an institutional cost? In its findings and conclusions, the study group acknowledged that there were variations in funding policies and practices among the T&E activities, that there were also mitigating factors with regard to organization, management,

geography and mission--that each center was unique in a number of respects (1:2). It further found that, "both full institutional and full user funding had inherent advantages, but both were impractical at all 26 activities, and that the advantages of a uniform funding policy were sufficient to warrant changes to achieve uniformity" (1:4).

With that conclusion, management of T&E underwent a drastic change. Department of Defense Directive 3200.11 was born along with the the terms Uniform Funding Policy, user funding, direct and indirect costs and reimbursements. On 1 July 1974, users of DoD major ranges and test facilities began paying a portion of the cost of the support provided.

The potential user of a test facility now estimates, over the FYDP, his anticipated test requirements and is charged for those direct costs that can reasonably be associated (in the eyes of an auditor) with a unit of testing. Within the Air Force, direct labor, POL, and utilities for the duration of the test are readily accepted as direct charges, but pre and post test activity, schedule delays, capital investment to accommodate testing, and a slice of management or overhead are not commonly accepted and have been challenged by the auditors (7:1).

Those costs of operation that cannot be charged to a user then become institutional costs that must be borne by the parent service. Over ten years of evidence has shown that the efficiencies which were anticipated by management emphasis and uniform funding polices to those who use and operate test activities have not occurred. In fact, they have had a significant negative impact on test center usefulness and productivity. Incentives which appeared admirable under the circumstances have caused unexpected results when implemented in the unique market place and budgetary environment of the federal government. Testing facilities are only instruments to provide a needed service to those who are performing research and development and the total costs of the development program usually eclipse the cost of testing. Yet the adequacy and timeliness of testing programs can strongly influence the success of RDT&E. The real cost of testing results from not identifying and fixing design deficiencies early in the development program, not from operating test facilities.

There is, however, sufficient historical data to substantiate the claim that the greater the cost of testing the less testing will be accomplished. While everyone is for sufficient quantity of testing, there is disagreement to the definition of

sufficiency. Advocates of higher charge rates to test customers are those who believe that too much testing is the rule and that unnecessary testing can be forced out by financial constraints. There is a dichotomous point of view held by those who favor lower charge rates that test programs are often inadequate and that high rates discourage necessary testing, and allow those who operate test centers and ranges to pass on a greater share of their operating costs to users. Now, after ten years under the DoD Uniform Funding Policy we find that it is not only not uniform, but it presents both groups with several interrelated dilemmas . For the purposes of this paper they will be addressed, in order, as the Reimbursement Dilemma, the Facilities Utilization Dilemma, the Operating/Budget Dilemma, and the Investment Dilemma.

THE REIMBURSEMENT DILEMMA:

DODD 3200.11 Created the MRTFB and directed that member ranges be funded under the "Uniform" or "user funding policy." What this means is that all direct costs that can be readily identified to users will be reimbursed to the ranges. Each service has implementing regulations that prescribe direct costs. For the Air Force, AFR 80-14 applies and Air Force Systems Command Regulation, AFSCR 172-8, a budget series regulation, establishes the direct cost

criteria (2:1). Total cost for conducting tests is therefore direct costs plus indirect costs where indirect would include all other costs associated with producing a test hour and operating a test facility. Indirect costs are borne by the parent command and include such things as indirect labor, most maintenance, investment in new capability, overhead, and, in short, all other expense items associated with maintaining the capability to support users. The total operating budget of the test center is therefore predicated on receiving direct costs as "Reimburseable Budget Authority" (RBA) from the user. The remaining funds, called "Direct Budget Authority," or (DBA) comes from the military department through the parent command. The total of the two is the TOA or Total Obligational Authority that the test center manager depends upon to operate for the fiscal year.

Inherent in this process lies several dilemmas. First, the estimate of future customer workload is dependent upon the vagaries of the development program, the DOD budget process and politics. Generally, program test schedules are very difficult to estimate more than 1-2 years in advance. For example, the C-17, T-46 and Advanced Tactical Fighter currently represent a significant workload at several DOD centers. If these planned tests do not

materialize, these centers will experience a funding shortfall, which if not made up by the parent organization, will result in at best deferrment of planned maintenance or modernization activities or at worst curtailing essential capability required by other users. Since the MRTFB charter is to maintain capability to support users, the maintenance and modernization accounts have been frequent targets resulting in a $67 Million Backlog of Maintenance and Repair (BMAR) at the three major RDT&E centers (9:20). The impact on investment will be covered more fully under the Investment Dilemma to follow.

Inability to accurately forecast future workload is only part of the Reimbursement Dilemma. Since it is very difficult to estimate future workload or the RBA received from testing and since it is nearly impossible to make up significant funding shortfalls in the short term, it is necessary for the test facility to recompute its direct charges based on a reduced capacity. The effect is to spread the cost of testing over fewer test hours, thus increasing the cost of testing to the remaining customers. This leads to the Facilities Utilization Dilemma.

FACILITIES UTILIZATION DILEMMA:

Because potential users are sensitive to cost and schedule, they will look for alternatives to

testing at DOD facilities. NASA and DOD contractors sometimes offer attractive options. NASA, because NASA facilities are essentially institutionally funded in that they only charge users for "additive cost." Contractor facilities also offer program managers some definite advantages. If the testing is to be performed at a prime or subcontractor's facility, schedule advantages usually result. These advantages are often sufficient enough that the program manager is inclined to make investments in required test capability at the contractor's plant instead of at DOD test facilities where the program must compete with other users on the schedule. The result is a proliferation of contractor test facilities that are tailored for a specific program rather than generic capability which will serve multiple programs. The downstream advantages to the contractor are obvious. At the same time, existing DOD test capability is underutilized as investment in new capability is being made at the wrong locations.

Policing where a program manager takes his testing would appear to present a logical solution and this is done at the MAJCOM. AFSC Sup 1 to AFR 80-14 directs that, except for some designated programs, "AFSC field activities will use AFSC test facilities for AFSC-managed T&E," and that they will "get approval before they plan, contract for, or

conduct T&E with non-AFSC test resources" (2:1). However, because pressures on the acquisition community are greater than the pressures to efficiently manage test facilities, the approval authority rests with the field commander responsible for the acquisition program. As a result, there is a regular and frequent number of waivers approved each year--28 in FY 85, and 118 FY 82-85 (8:31). Unfortunately, the approval process does not capture those instances where testing is done at a contractor's facility contributing to the Investment Dilemma to be addressed later.

THE OPERATING BUDGET DILEMMA:

The Operating Budget Dilemma arises from the difficulties in maintaining a stable operating program at the test centers throughout the budget year and year-to-year under the concept of user funding. This situation is akin to a commercial service maintaining a full range of services during drastic fluctuations in customers' demand. Unless that business is able to increase its share of the market it must curtail services. However, unlike a commercial service industry, the MRTFB is chartered not only with maintaining a full range of services, but with improving and modernizing its capability to serve customers who cannot anticipate their own needs beyond two years in advance--significantly shorter

than budget lead time allows.

At the test centers, failure to earn anticipated RBA, or unprogrammed expenses such as increases in POL and utilities, sharply curtail funds available for maintenance and investment items. The $67 million BMAR, previously addressed, was largely the result of inflation which increased cost of operation at the centers, at the same time that their budgets lagged DOD inflation by over $360 million dollars. The Operating Budget Dilemma directly affects the planned investment program--leading to the Investment Dilemma.

THE INVESTMENT DILEMMA:

The investment portion of the test center's program is called the Improvement and Modernization Program (I&M). Since both the operations and maintenance and I&M costs are funded within the same RDT&E appropriation, the major source of program flexibility to cover unprogrammed operations costs has been the I&M Program. Center commanders faced with paying utility bills and a civilian payroll have opted not to invest in additional capability which they can not afford to operate. In recognition of this problem, in 1981, DoD directed that the Air Force shift the major I&M programs to a separate line in the RDT&E Appropriation creating a separate Program Element (13:1). This change testified to the

importance DOD placed on maintaining a continuing program to modernize test capabilities to provide adequate testing of constantly improving weapon systems. Moreover, it was moot testimony of DOD's lack of confidence that the MRTFB market place mentality, spawned by the user funding policy, was capable of providing the required capability to test.

We've now come full circle in describing the several dilemmas imposed on the test community by what was originally thought to be a change to promote uniformity and therefore efficiency in the way test centers operate. Instead of promoting consistency, efficiency and lower institutional costs, the T&E funding policy brought reimbursement fluctuations which affect financial posture, curtailed maintenance and modernization and increased the cost of testing so that large programs eliminated needed testing and many small technology programs now cannot afford to test.

CHAPTER III

TECHNOLOGY/TEST ADVOCACY--A MINOR CORPORATE VOICE:

Each year, the Air Force program is built from the bottom up. In building the FYDP, the core program is funded first. The core contains funding for operations and training; essential levels of readiness and sustainability and R&D; Directed Programs, like intelligence and strategic systems; and operation of our bases and facilities worldwide. This core constitutes about 75 percent of the available TOA. The remainder is for force structure growth, increased levels of readiness and sustainability and R&D (19:20). That they are listed in this order by HQ USAF/PRP is not accidental, but represents a generally accepted priority, which is consistent with the goals of the administration. The hollow military of the seventies needed buttressing, but in the effort to strengthen today's forces, we lost sight of the basic R&D which must occur to insure that tomorrow's forces are capable of meeting future threats.

Chart 4, referenced earlier, graphically represents the dramatic effort that went into building force structure and restoring readiness and sustainability. The procurement accounts far outstripped the R&D accounts. But that one chart doesn't tell the whole story. Chart 1 shows the

trend in tech base funding in FY 86 dollars. Charts 5 and 6 compare Test funding--identified as PE 65807 on chart 5 and as a component of total RDT&E (3600 appropriation) funding on chart 6--with DOD inflation. The message is clear--that while total investment in RDT&E has outstripped inflation, funding for tech base and test have severely lagged due to a lack of corporate equity in the resource allocation process.

BARRIERS TO CORPORATE EQUITY:

There are two major barriers to achieving corporate equity in the HQ USAF resource allocation process. They are perceptual and structural barriers. Like the chicken and the egg, it is difficult to determine which came first. Hap Arnold had a strong appreciation of the contribution of testing, but today's leadership caught up in building force structure and improving readiness and sustainability has apparently lost sight of the underpinning provided by R&D and has created a corporate structure that deals with the technology base and test base on the margin.

The thirteen Mission Area Panels form the base of the PPBS corporate pyramid at HQ USAF. In general, each has a functional interest and each MAJCOM is essentially funded by its respective panel. On the surface it looks like a fair system. If TAC

wants a new F-15 and a new dormitory it must find the TOA from within the Tactical Panel. The RDT&E Panel, referred to as the J Panel, operates in a similar manner programming and budgeting 3600 Appropriations, largely the province of AFSC. If AFSC wants a new dormitory, needs an Avionics Test Facility to test the TAC Panel's Advanced Tactical Fighter and needs to upgrade its airspace surveillance radars, the funding must come from J Panel TOA. Even if the radar is to allow simultaneous development testing and SAC and TAC operational test and training on AFSC's ranges, the TOA must come from the J panel, without T or S Panel participation. This isn't hard policy--just accepted practice.

Since one of the basic tenets of the requirements process, and of the MRTFB funding policy, is that the user pays, one would expect the S and T panels to fund for their requirements or at least provide resources in some rational proportion to the benefits received. The examples presented aren't frivolous. For several years AFSC has been attempting to improve the efficiency of its Utah Test and Training Range. About 90 percent of the sorties flown on this range are for TAF test and training. The remaining ten percent are for AFSC development testing, yet repeated efforts to secure cross panel funding have failed.

In the case of the ATF avionics test facility, there is insufficient capacity in the IFAST facility at Edwards AFB for the ATF. The Tactical Panel would rather pretend that the B-1, F-15, and F-16 will no longer need to test--which history has shown to be unrealistic--than fund J Panel construction. In the end, TOA for the dormitory gives way to an ATF bay in IFAST and the surveillance radars which would represent a capability available to many users do not get funded to maintain the integrity of the panel structure.

STRUCTURAL AND PERCEPTUAL BARRIERS--THE MAJCOM VIEW:

Because of the perception, fostered by the creation of a marketplace based MRTFB, that the centers can earn their own way, they are viewed as a level-of-effort activity. This means that, except for year-to-year pricing changes, the T&E account should be a no growth program, when in fact, programmatic changes like increased O&M associated with supporting new programs increases the center's costs of operation. The reality of the situation is that the T&E account has not kept pace with inflation and in fact is frequently the target for undistributed budget cuts because it is considered a level-of-effort program and the impacts are not "fall-off-the-cliff" impacts, like reducing force structure or delaying IOCs.

Spurred by unprogrammed increases in test cost caused by inflation, increases in POL, and program office and laboratory reluctance to use organic test capability, HQ AFSC initiated a study of Test and Evaluation Reimbursement Policy at the MRTFB. In study surveys, the AFSC Product Divisions (equivalent to Numbered Air Forces) expressed "... particular concern regarding test cost increases which occur after their program budgets are finalized." Space Division (the largest Product Divison) and Armament Division indicated they, "are exploring ways to reduce or avoid use of MRTFB facilities..." challenging the cost effectiveness of the Current AFSC Waiver Policy" (18: Atch 5). The AFSC laboratories reported that, "test programs are being detrimentally affected by the high test costs and that less testing is being accomplished," and that, "they are exploring the possibility of contracting out ...tasks formerly accomplished" with command aircraft (18:Atch 5). These comments are strong indictments of the result of placing management uniformity above maintaining essential capability in the operation of the nations's test ranges. That indictment notwithstanding, the study offered two band aid adjustments to ameliorate the shortcomings of the existing funding policy. Both were directed at reducing the cost of testing by institutionalizing

certain categories of test cost--Depot Maintenance Industrial Funding (DMIF) for Aircraft Maintenance and Demand Charges for electricity purchased from the Tennessee Valley Authority to operate test facilities at AEDC. The process of implementing these policy changes provides useful insight into the structural and perceptual barriers facing the test base.

Both changes represented command efforts to move away from user funding toward institutional funding, but the DMIF case is most instructive. First, AFSC is the only MAJCOM in the active force, other than MAC, to have its aircraft maintenance funded through the industrial fund. MAC, which provides airlift through the Airlift Service Industrial Fund represents another "user funding" model. Due to increases in Air Force Logistics Command labor and contract rates in the 1970's, DMIF costs had grown to, depending on model of aircraft, 25-30 percent of flying costs (18:6). By institutionally funding DMIF, the cost of a test flying hour would be reduced for users, and the test centers' RBA sensitivity would be reduced by lowering the RBA/DBA ratio.

The change entailed moving a funding offset equal to the increase in AFLC rates from user accounts to the T&E account in a Zero-Balance Transfer (ZBT). The timing for such a policy change

seemed right as HQ USAF/LE was funding the aircraft maintenance increase across the rest of the O&M (3400 Appropriation) funded Air Force. However, when it came time to fund the RDT&E account (3600 Appropriation), corporate Air Force's marketplace perception of the T&E account held sway. While the 3400 accounts were fixed by adding TOA, the 3600 account could only be fixed by transferring offsets from the program office accounts to those of the test centers--straining an already strained relationship between test users and testers.

CHAPTER IV

CONCLUSIONS

Until changes are made in the operation and management of Air Force test centers and ranges, the numerous problems highlighted in this report will persist. Test costs will increase as more and more users seek lower cost alternatives to testing (Capacity Dilemma). With the loss of RBA (Reimbursement Dilemma), test centers will become even more sensitive to price changes (Operation Budget Dilemma) and their ability to effectively plan and program will cause the cancellation or deferral of needed maintenance and modernization (Investment Dilemma). The less capable facilities will then attract fewer and fewer users. This deadly spiral has already started.

The most meaningful structural change would be to end the capitalistic experiment with T&E and return to institutional funding for Air Force test centers and ranges. The Navy is already moving in that direction by separating major test center overhead items, like DMIF, into a Naval Industrial Fund (NIF). As a result, the Navy MRTFB activities are approximately 48 percent institutionally funded as compared to 40 percent for the Air Force, and are therefore less senstitive to fluctuations in RBA (12:6).

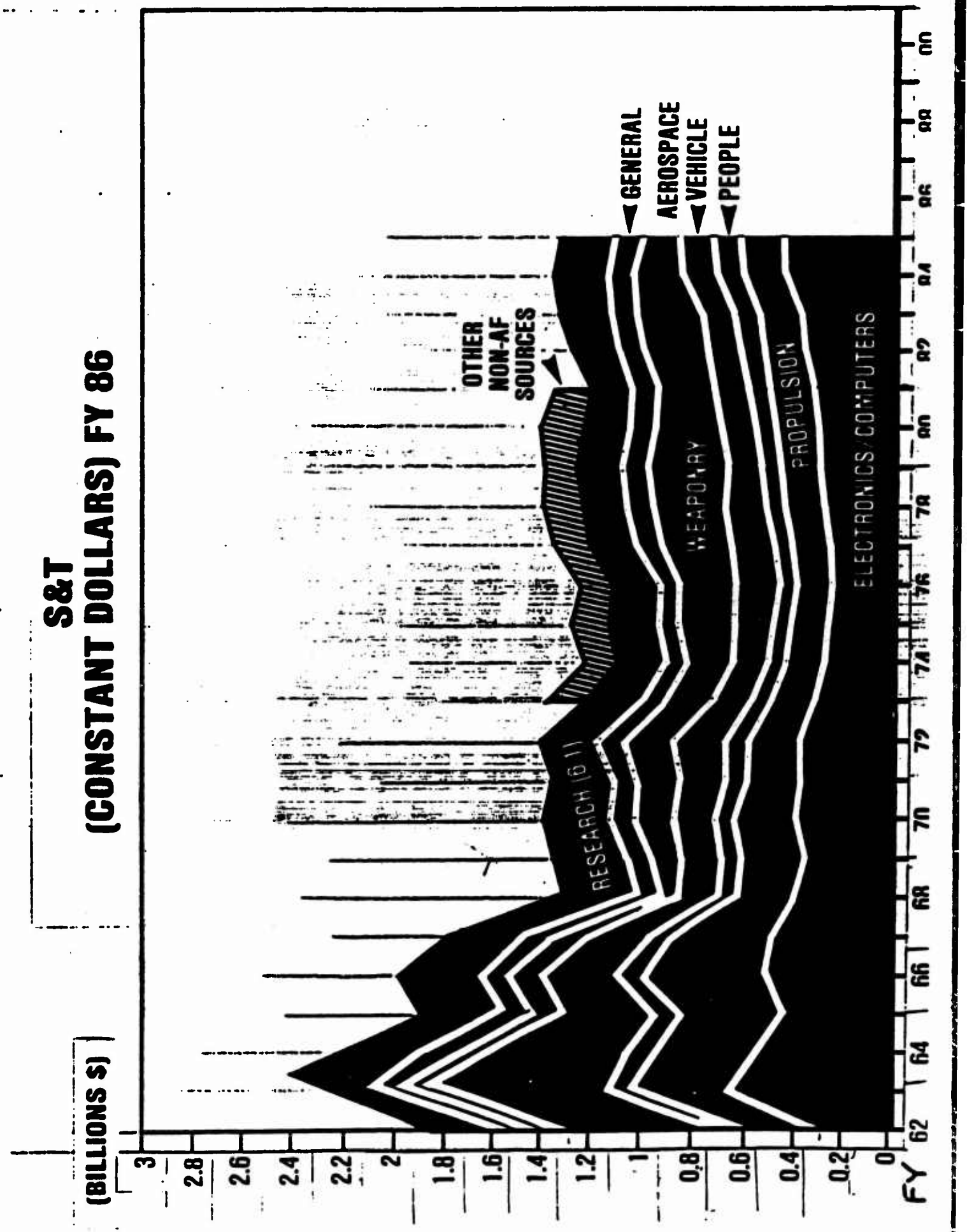
A second change would be to direct cross panel funding for major test facility and instrumentation systems required to support parented programs. Congress wants to know total system and life cycle costs for new weapon systems. That calculation, however, must include the cost of support facilities required in the development phase as well as during operational use.

The third change would be to tax all using programs with a levy for those facility and instrumentation upgrades that provide generic capability. This could be achieved by assessing each panel a fixed percent of its RDT&E development effort for testing support. Program managers paying up front for test capability would be incentivized to identify required capability early. They would also be less inclined to pay for duplicative capability at a contractor's facility, thus stemming the flow of dollars away from Air Force ranges and test centers.

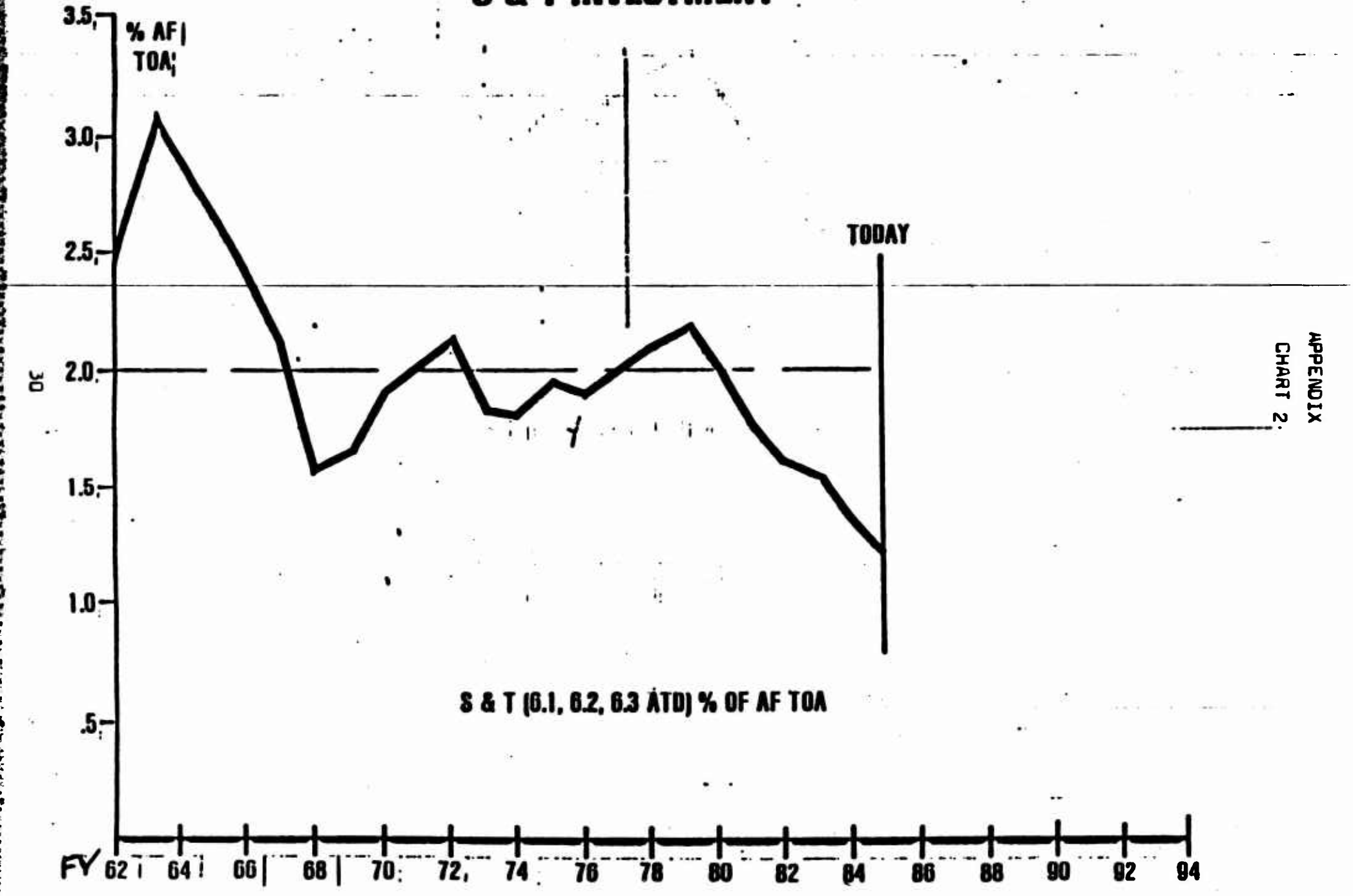
Each of these proposed structural changes, the detail of which is beyond the scope of this paper, would go a long way toward changing the way the corporate Air Force views the MRTFB. Over time, the corporate Air Force would come to view its organic test capability as an integral part of a defense strategy of producing technologically superior weapons systems to deter, and if necessary, to defeat

a numerically superior adversary. Air Force leadership might once again recognize that having technologically superior systems, means assuring adequate test capability to transition technology to reliable, effective weapon systems.

APPENDIX
CHART 1



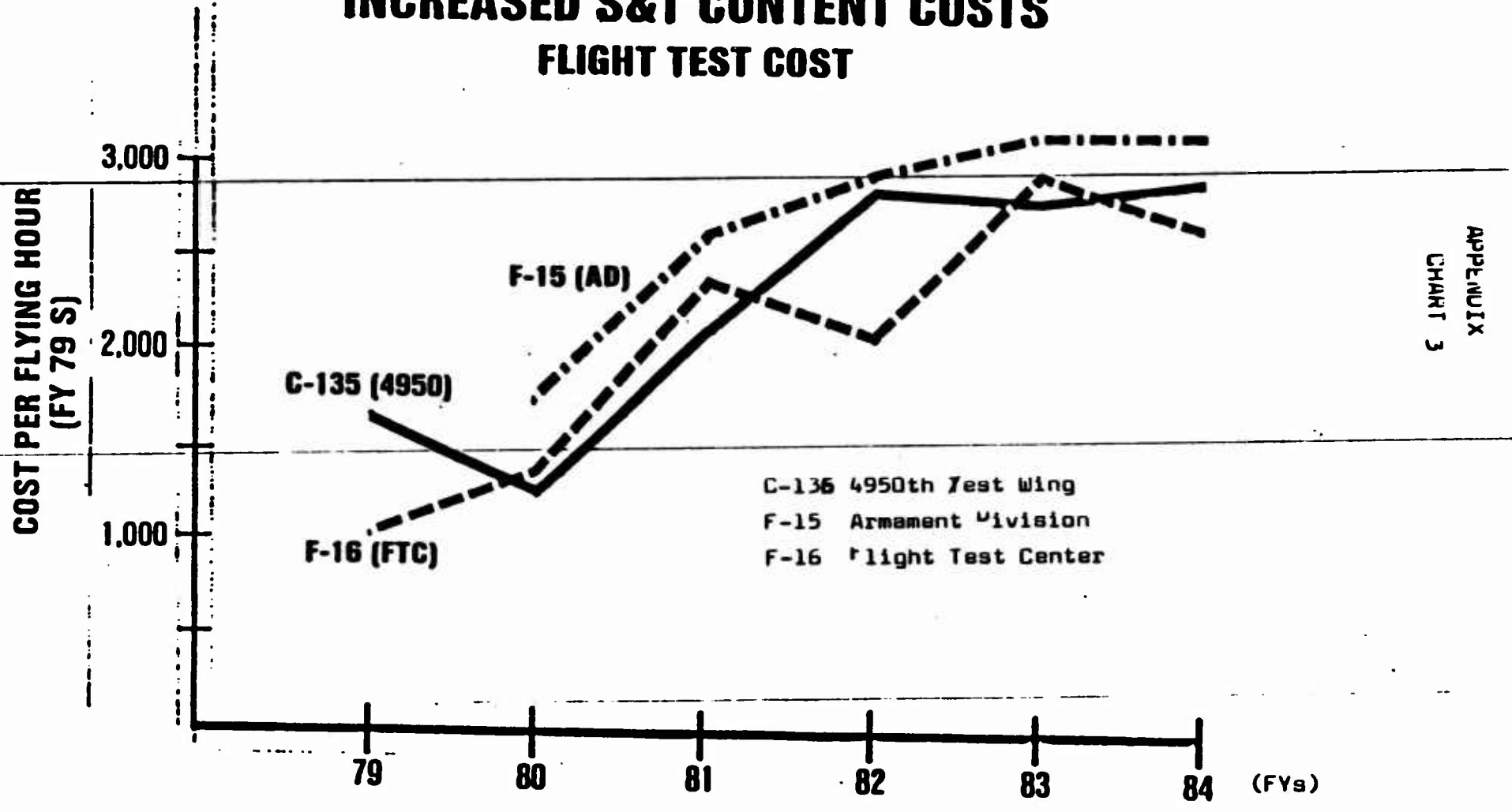
S & T INVESTMENT



APPENDIX
CHART 2.

INCREASED S&T CONTENT COSTS

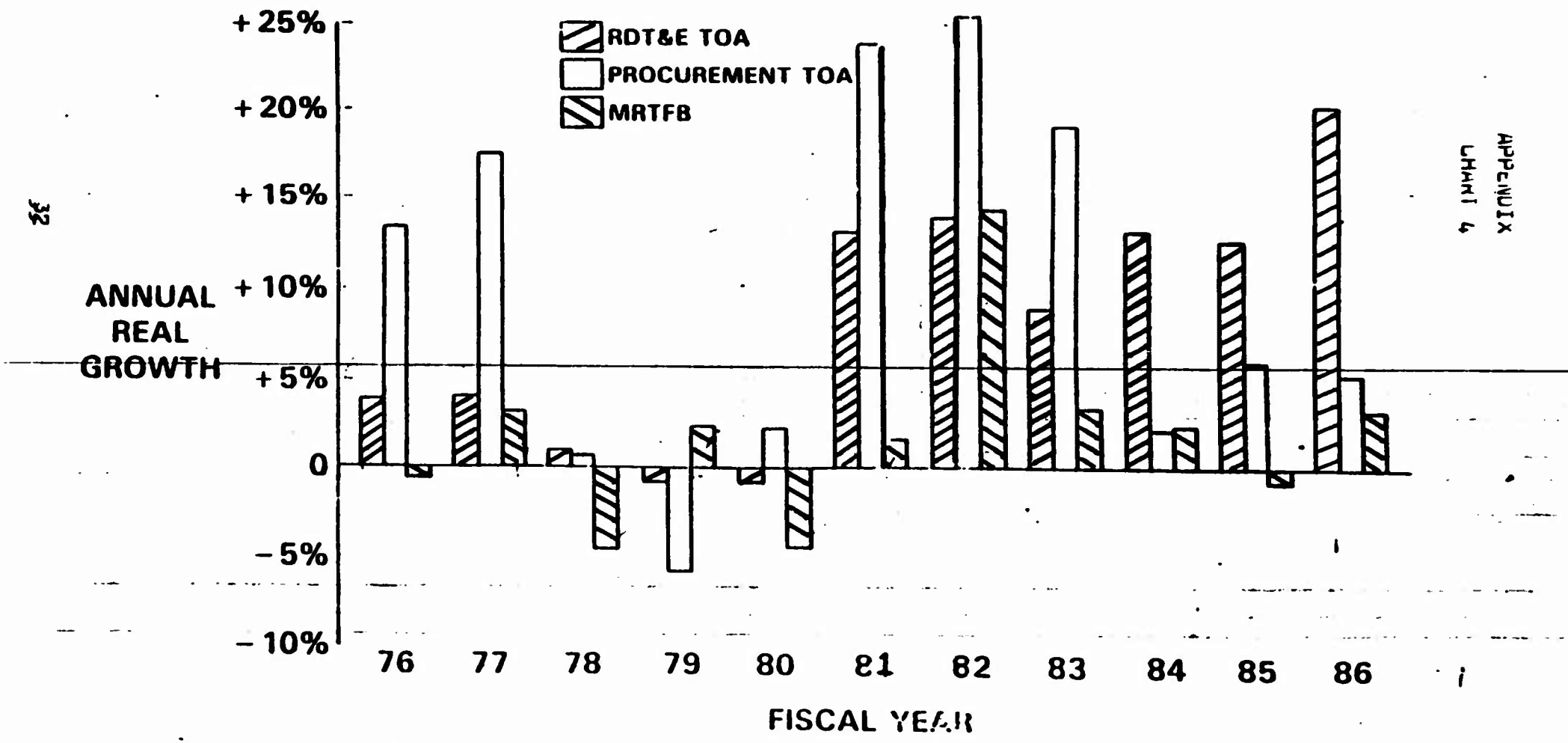
FLIGHT TEST COST



APPENDIX
CHART 3

4

ANNUAL REAL GROWTH

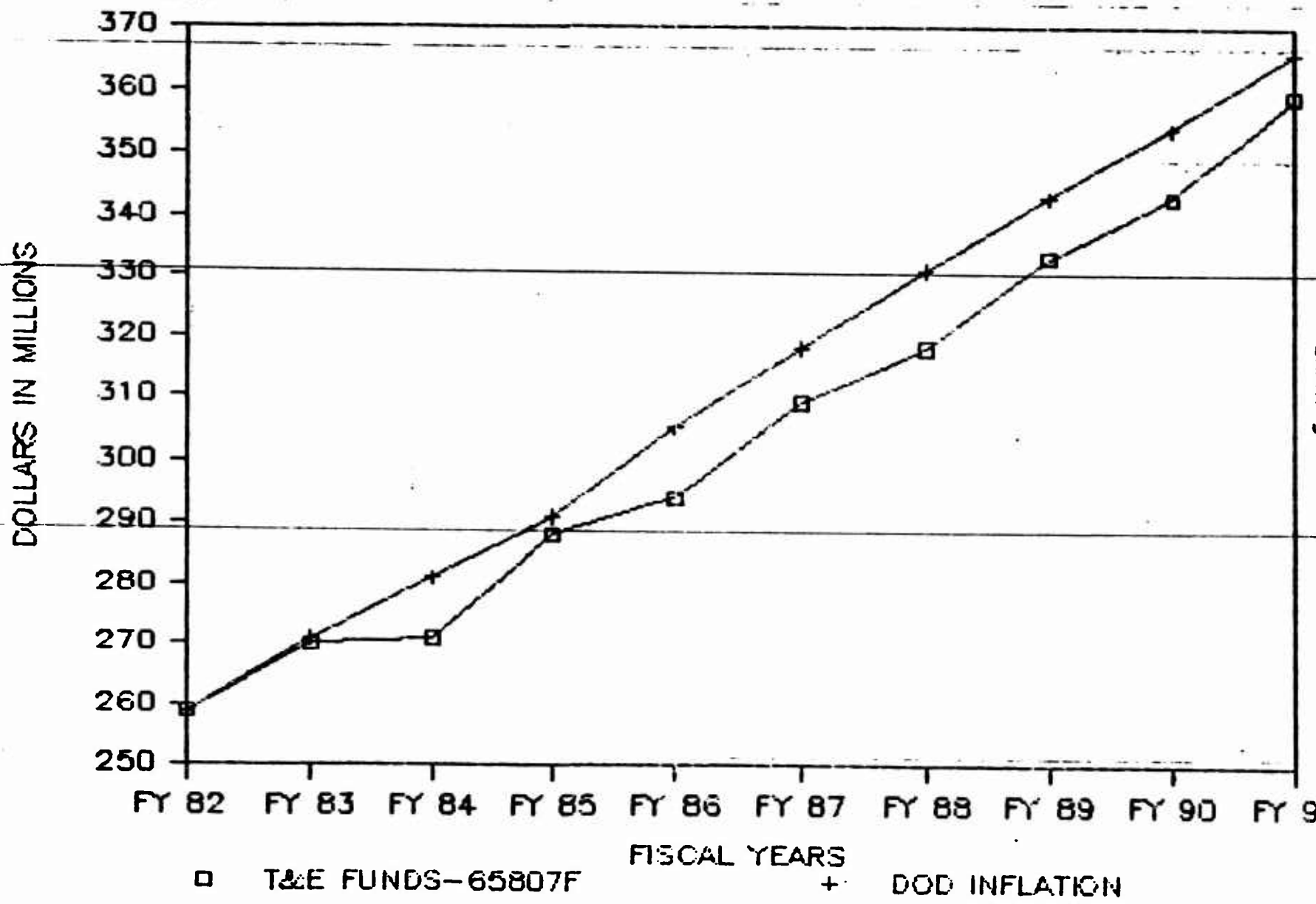


APPENDIX
CHART 4

CHART 3

1979 4

(PROGRAM ELEMENT) PE 65807F T&E FUNDING



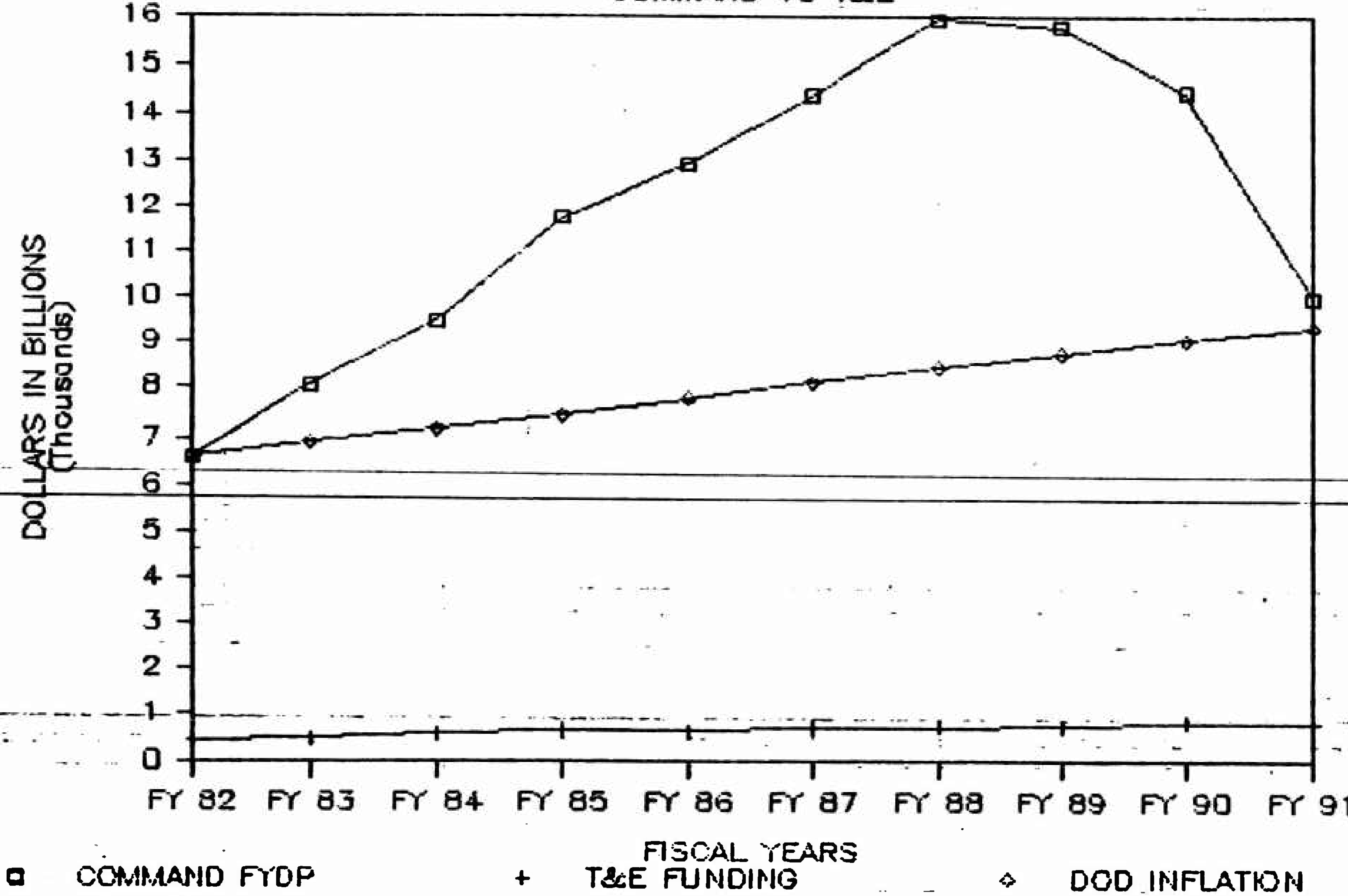
APPENDIX
CHART 5

APPENDIX

CHART 6

RDT&E — 3600

COMMAND VS T&E



REFERENCES

1. A Study of Funding Policy for Major Test & Evaluation Support Activities, Department of Defense Report, 25 April 1972.

2. AFSC, Supplement 1 to AFR 80-14, Hq AFSC Andrews AFB, MD, 17 Nov 1982.

3. Air Force Science and Technology Program, HQ AFSC DC/S Science and Technology ltr, 28 MAR 84.

4. Carroll, John D., Test and Evaluation-Uniform Direct Cost Funding Policy Ten Years Later (1974-1984). Student Report LD56904A, Professional Military Comptroller Course, Leadership and Management Development Center, Air University, Maxwell AFB, AL, Class 84-B.

5. Corporate Investment Guidance, Hq AFSC, Andrews AFB, MD, 11 Jun 1984.

6. Department of Defense Directive 3200.11, Major Range And Test Facility BAse, Department of Defense, Washington D.C., 29 Sep 1980.

7. Draft Report of Audit 827683, Selected Aspects of Range and Test Facility Management, Hq Air Force Audit Agency, Norton AFB, CA, 17 Dec 1982.

8. Functional Management Review, DC/S Test and Evaluation, Hq AFSC, Andrews AFB, MD, 28 Jan 1986.

9. FY 85 Program Objective Memorandum (POM) Management and Support Review Committee Findings/Conclusions, HQ AFSC, Andrews AFB, MD, 7 Mar 83.

10. Management & Support Funding Overview, Hq AFSC, Andrews AFB, MD, August 1984.

11. Managing the Air Force, Reference Text, Department of Leadership and Management, Air War College, Maxwell AFB, AL, 1983.

12. Navy Industrial Fund (NIF) Activities Reimburseable Orders, Briefing presented at the MRTFB Financial Management Conference, Wright-Patterson AFB, OH, 19-20 Jun 1984.

13. Program Management Directive No. R-R 2164(1)/64755F, Improved Capability for Development, Test and Evaluation, 16 Sep 82.

14. Rankine, Robert R, Jr. Brig Gen, USAF, Air Force Science and Technology Program, A Briefing to The Air Staff Board, Oct 86.

15. Richardson, W.A., Test and Evaluation Overview, Hq AFSC Security Review Case PAS 85-696. 28 Jun 85.

16. Smith, Stephen R., Major, USAF, F-16 Flight Test Engineer, An Interview, 1 Mar 1986, Air University, Maxwell AFB, AL.

17. Soileau, Randall, L. Capt, USAF & Swanson, Phillip, A. Capt, USAF, An Assessment of the Uniform Funding Policy of DOD Directive 3200.11, Air Force Institute of Technology, Air University (ATC), Wright-Patterson AFB, OH, Sep 80.

18. Test and Evaluation Reimbursement Policy at the Major Range and Test Facility Base (MRTFB), Hq Air Force Systems Command Study Group Report, 30 October 1981.

19. The Planning, Programming and Budgeting System (PPBS), A Primer, Directorated of Programs and Evaluation, DC/S Programs & Resources, Department of the Air Force, Washington D. C. Dec 1983.